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# POISON IVY AND POISON SUMAC AND THEIR ERADICATION

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**M**ANY PERSONS obtain their first acquaintance with poison ivy or its relative, poison sumac, by being painfully poisoned, sometimes as the result of collecting the foliage of these plants for ornamental purposes, despite the fact that it is generally known that contact with them may produce severe inflammation of the skin.

In many localities throughout the country poison-ivy growth is so abundant as to discourage attempts to destroy it in order to reduce the danger of injury, and even under more favorable circumstances cases of accidental poisoning must be expected. The very large number of these cases, however, could be greatly reduced if simple means of recognizing the plants, of avoiding poisoning by them, and of destroying them were more generally understood.

As a preventive measure, thorough washing is recommended, since the poison usually requires some time to penetrate into the tender layers of the skin, and until such penetration has taken place much or all of it can be removed. Ordinary alkaline kitchen soap is best for this purpose. A thick lather should be produced and the washing repeated several times, with thorough rinsing and frequent changes of hot water.

The methods of destroying poison-ivy growth include spraying with salt brine (3 pounds of salt to the gallon of water) repeated several times if found necessary at intervals of a week or two, pulling by hand or grubbing out small areas, frequent mowing, and, in fields, plowing followed by the cultivation of hoed crops.

Poison sumac usually occurs in swampy inaccessible locations where the expense of eradication is not warranted. When it grows along the edges of paths or roads or in frequented places it should be cut off close to the ground, after which the roots should be grubbed out or killed by applying salt, crude oil, or chemicals to the newly cut surfaces and the surrounding soil.

# POISON IVY AND POISON SUMAC AND THEIR ERADICATION.<sup>1</sup>

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## IVY AND SUMAC POISONING LARGELY PREVENTABLE.

**A**LTHOUGH it is generally known that contact with poison ivy and poison sumac may cause painful inflammation of the skin, many persons are poisoned because they do not know how to recognize and avoid these plants. Much injury is caused by permitting poison ivy to spread year after year along roadways and much-used paths, frequently in small patches that could be destroyed with comparatively little effort or expense. Accidental cases of ivy and sumac poisoning are to be expected, but the very large number of these cases could be greatly reduced if simple means of detecting and dealing with the plants and of preventing their poisonous effects were more generally understood.

## THE POISON-IVY PLANT.

The poison-ivy plant is also known as poison oak and by various local names, such as three-leaved ivy, poison creeper, climbing sumac, markweed, picry, and mercury. It grows in the form of woody vines, trailing shrubs, or low erect bushes and adapts itself to the greatest variety of conditions, flourishing in woods or in the open, in low moist soil or in dry soil, and on hillsides. It is especially

<sup>1</sup>The Public Health Service has recently issued a general summary of the available information on this subject in an article under the title "Ivy and Sumac Poisoning," by E. A. Sweet and C. V. Grant, prepared in collaboration between that service and the United States Department of Agriculture and published in Public Health Reports, vol. 35, pp. 435-458, Feb. 27, 1920. As the edition of the report specified was limited it has been found desirable to make the information available for further distribution in the form of the present bulletin, which is based largely upon the article mentioned. The methods of eradication herein suggested were developed as the result of experiments carried on by the Office of Forage-Crop Investigations.

abundant along fence rows and at the edges of paths and roadways, scrambling over rocks and walls, climbing posts or trees to considerable heights, often mixed with other shrubbery in such a way as to escape notice until attention is attracted to it by the occurrence of cases of poisoning.

Poison ivy, or poison oak, is found in one or more forms in practically all sections of the country. The various forms, while they include several distinct botanical species, differ mainly in the shape and margins of the leaflets, the size of the fruit, and the habit of



FIG. 1.—Leaf of poison ivy (*Rhus radicans* L.). The poison-ivy leaf is always divided into three leaflets.

growth and are so much alike in general character that familiarity with any one form will make it possible to recognize the plants wherever encountered, whether as vines or shrubs, or at least to avoid all plants bearing a suspicious resemblance to them.

#### HOW TO DETECT POISON IVY.

The plants are most readily recognized by their leaves, which are always divided into three leaflets in the manner shown in figure 1, and by their whitish waxy fruits,

which look somewhat like mistletoe berries, each containing a single stony seed. The homely saying "Leaflets three, let it be" offers a measure of safety to those who are unacquainted with poison ivy, even though it may occasionally lead to undue suspicion and the avoidance of some innocent or harmless plant. The plants do not all bear fruits but, when discovered, the whitish or cream-colored berries (more correctly called drupes), shown on the fruiting specimen in figure 2, make recognition positive. These remain far into the winter and thus point out the plants long after their leaves have fallen.

## DESCRIPTION OF THE PLANTS OF POISON IVY.

The vines will be found spreading by underground root stems and sending up an abundant shrubby growth, the branches of which show a tendency to ascend any convenient support, attaching them-

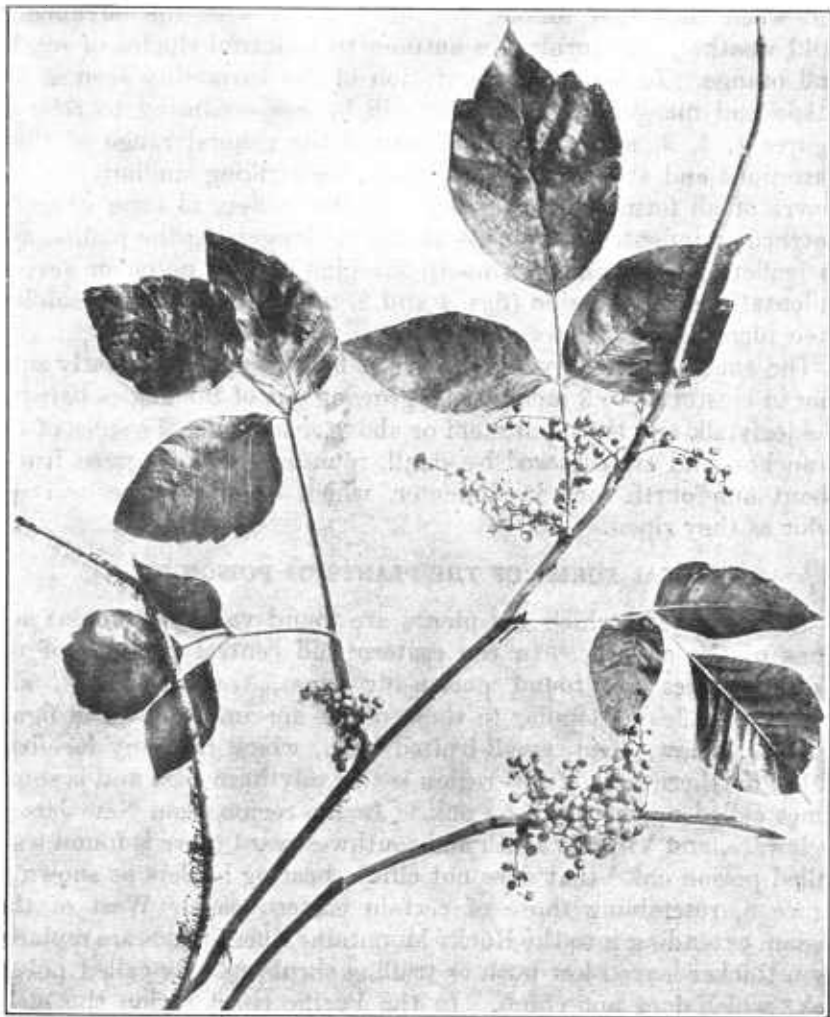


FIG. 2.—Poison ivy (*Rhus radicans* L.). Branches of the poison-ivy vine, showing the leaves, fruit, and aerial rootlets.

selves by means of masses of the small rootlets illustrated in figure 2, but lacking the twining tendrils found on many climbers.

The erect bushes or trailing shrubs attain a height varying from a few inches to about 3 feet, but in favorable situations may make a luxuriant bushy growth 4 or 5 feet high.

The leaves of all forms have stout, rather long stalks, bearing three leaflets, two of which are opposite and short stalked, while the end leaflet is long stalked. The leaflets vary from 1 to 4 inches in length and when mature are dark green on the upper surface, lighter and sometimes velvety underneath. The crinkly young leaves are red when they first unfold, becoming green with the advance of mild weather, and turning in autumn to beautiful shades of scarlet and orange. In lieu of a description of the variability seen in the shape and margins of leaflets, it will be less confusing to refer to figures 1, 2, 3, and 4, which illustrate the general range of these variations and at the same time show the striking similarity in the leaves of all forms. The tendency of the leaflets to form irregular notched or indented margins is an aid in recognizing the plants, and in leaflets with generally smooth margins a deep notch or several indentations on the side (figs. 1 and 2) will often serve to confirm their identification as poison ivy.

The small 5-petaled yellowish green flowers appear in early summer in clusters 1 to 3 inches long, growing out of the angles between the leafstalk and the plant stem or above scars along the sides of the branches, and are followed by small, roundish, smooth green fruits, about one-fourth inch in diameter, which become white or ivory color as they ripen.

#### LOCAL FORMS OF THE PLANTS OF POISON IVY.

The forms<sup>2</sup> in which the plants are found vary in different sections of the country. In the eastern and central portions of the United States are found poison-ivy vines, trailing shrubs, and bushes with leaves similar to those of the specimen shown in figure 2;<sup>3</sup> also a low, erect, small-fruited bush, which in many localities in the northern part of this region is the only form seen and is sometimes called northern poison oak.<sup>4</sup> In the region from New Jersey, Delaware, and Virginia south and southwestward there is found a so-called poison oak<sup>5</sup> that does not climb, bearing leaflets as shown in figure 3, resembling those of certain eastern oaks. West of this region, extending into the Rocky Mountains, these forms are replaced by a thicker leaved low bush or trailing shrub, usually called poison oak,<sup>6</sup> which does not climb. In the Pacific coast region the plant generally known as poison oak<sup>7</sup> occurs as a bush, with leaflets as

<sup>2</sup> Poison ivy and poison sumac comprise a toxic group which has generally been placed by botanical authors under the genus *Rhus*. By some botanical authors they are grouped under the generic name *Toxicodendron*.

<sup>3</sup> *Rhus radicans* L.

<sup>4</sup> *Rhus microcarpa* (Michx.) Steud. By some authors considered only a form of *Rhus radicans*.

<sup>5</sup> *Rhus quercifolia* (Michx.) Steud. The name *Rhus toxicodendron* has been applied to this plant by some authors, but is generally considered to refer to the poison-ivy vine (*Rhus radicans*).

<sup>6</sup> *Rhus rydbergii* Small. By some authors this is considered only a low form of *Rhus radicans*.

<sup>7</sup> *Rhus diversiloba* Torr. and Gray.

shown in figure 4, resembling the leaves of western oaks, but it is also found as a vine and is sometimes called poison ivy or yeraa.

It may be noted that in various localities the plants with leaflets resembling certain kinds of oak foliage, including certain forms that do not climb, are sometimes called poison oak. This name is often used to distinguish such forms from poison-ivy vines. As climbing forms are found with oak-leaved foliage and leaflets of the poison-ivy

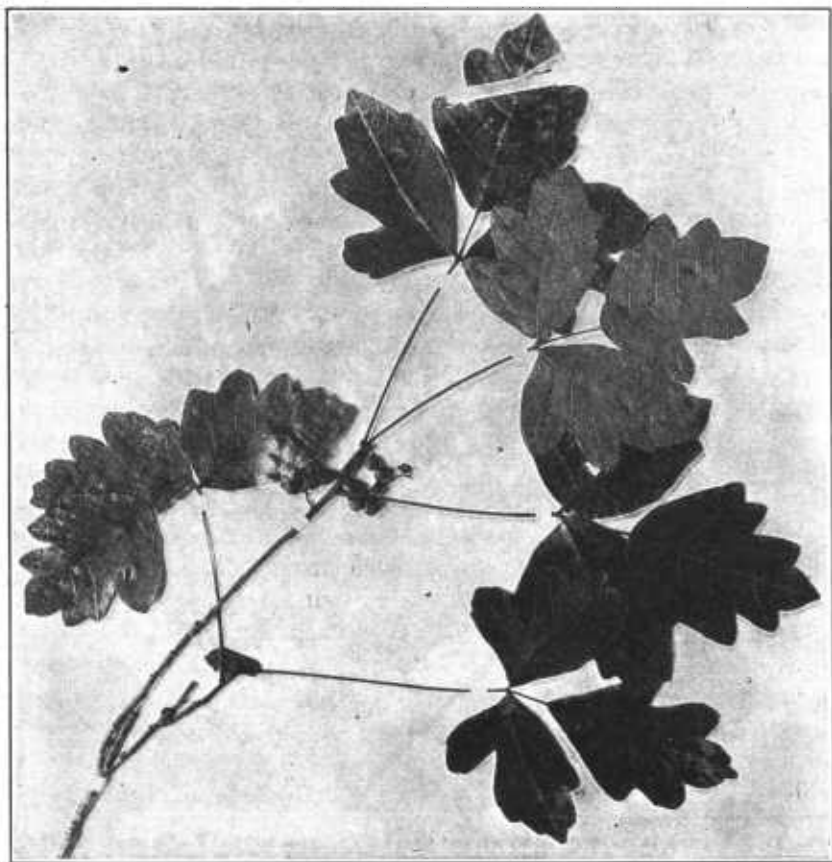


FIG. 3.—Poison oak (*Rhus quercifolia* (Michx.) Steud.) of the eastern United States.

vine forms are frequently more or less lobed like oak leaves, efforts to make this distinction between poison ivy and poison oak are confusing, and many persons use either name for all forms of the plants.

#### CONFUSION OF POISON IVY WITH THE VIRGINIA CREEPER.

In the Eastern States and westward as far as Wyoming to Texas, the Virginia creeper<sup>8</sup> is found generally in the same locations as

<sup>8</sup> *Parthenocissus quinquefolia* (L.) Planch.



poison-ivy vines, often mixing with the ivy growth, which it resembles in its climbing habit and in the shape of its leaflets. In this way it is sometimes confused with poison ivy, but it is harmless to the touch and is readily distinguished by its leaves, which generally bear five leaflets to a stalk, as shown in figure 5. It climbs partly by aerial rootlets, like those of poison ivy, but also has numerous tendrils,

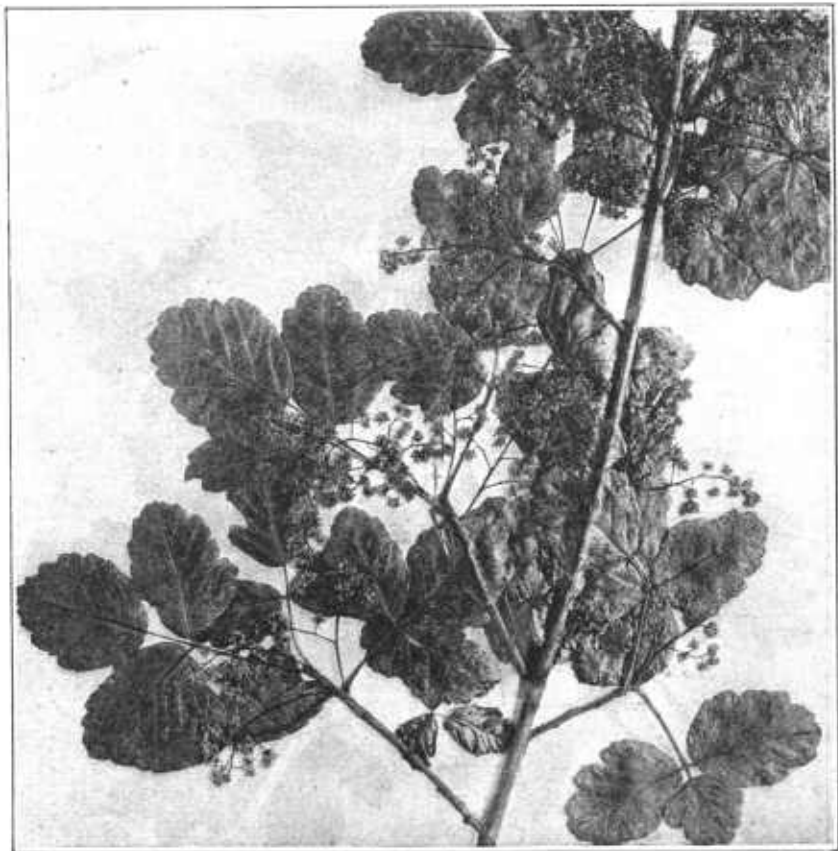


FIG. 4.—Poison oak (*Rhus diversiloba* Torr. and Gray) of California and the Pacific coast. Portion of the branch in flower.

like those of grapevines, and it has red-stemmed blue fruits, each containing two or three seeds.

#### THE POISON-SUMAC PLANT.

Poison sumac<sup>9</sup> is also known as swamp sumac, poison elder, poison ash, poison dogwood, and thunderwood. It grows only in swamps or in wet ground. It is found from the New England States south as far as Florida and westward to Minnesota, Arkansas, and Louisiana. It grows as a shrub in clumps, with tall slender

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<sup>9</sup>*Rhus vernix* L.

stems 6 to 10 feet or more in height; also frequently as a tree up to 20 or 30 feet high, with a trunk 5 to 10 inches in diameter.

#### HOW TO DETECT POISON SUMAC.

The leaves of poison sumac are divided into 7 to 13 leaflets, arranged in pairs with a single leaflet at the end, as shown in figure 6. The avoidance of shrubs growing in low land with leaves of this general character is a safe rule for persons not well acquainted with poison sumac, although it may lead to needless avoidance of some harmless plants. The cream-colored fruits of poison sumac, resembling those of poison ivy but growing in looser clusters, 3 to 8 inches long, remain through the winter and make recognition positive. Poison sumac grows only on wet land, but sometimes occurs in unsuspected places along roadways at the edges of swamps or along low, miry banks of streams.

#### DESCRIPTION OF POISON SUMAC.

The poison-sumac bush or tree has smooth grayish bark on the trunk and older branches, while the young new branches are reddish brown. The leaves vary from 7 to 14

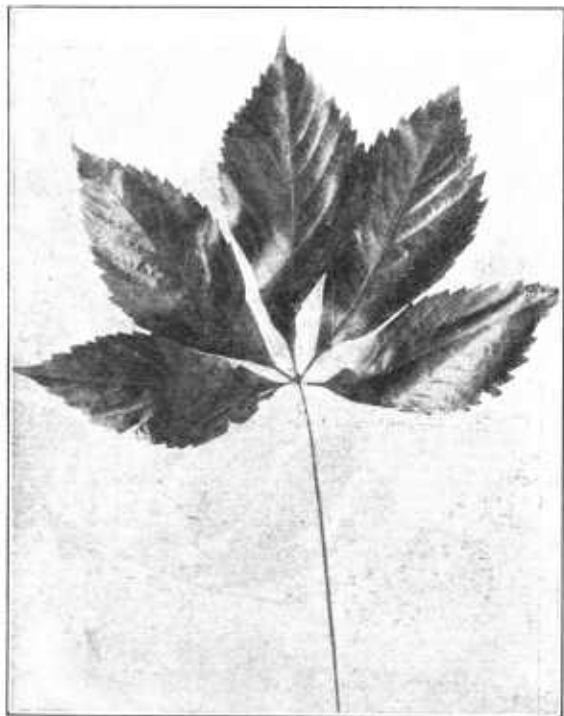


FIG. 5.—Leaf of Virginia creeper (*Parthenocissus quinquefolia* (L.) Planch.). Note that the leaf is divided into five leaflets.

inches in length and consist of a clean stalk bearing 7 to 13 leaflets, arranged opposite one another in pairs, with a single, usually long-stalked leaflet at the end. The leaflets, which are of an elongated oval shape with whole margins, grow from 3 to 4 inches long and  $1\frac{1}{2}$  to 2 inches wide. They are velvety and of a bright-orange color when they first appear in the spring, later becoming dark green and glossy on the upper surface, with prominent scarlet midribs, and paler green underneath. They turn early in autumn to brilliant red, orange, and russet shades. The small 5-petaled

yellowish green flowers appear early in summer in loose slender clusters about 3 to 8 inches long, growing out of the angles of the leafstalks near the ends of the branches. They are followed by shining ivory-white or cream-colored fruits, resembling those of poison ivy, about one-fourth inch in diameter, each containing a single stone.

**CONFUSION OF POISON SUMAC WITH HARMLESS SUMAC AND OTHER PLANTS.**

As suggested by the names applied to it, poison sumac is often confused with elder; certain kinds of ash, and various other shrubs and trees bearing somewhat similar foliage; also with dogwood to which



FIG. 6.—Poison sumac (*Rhus vernix* L.). From a water color by F. A. Walpole.

it bears no resemblance. It is at once excluded from plants growing in high, dry locations, though it is sometimes found at the edges of swamps and bogs or where the ground is somewhat dry during part of the year. Its loose, drooping clusters of flowers, followed by smooth ivory-white fruits, are readily distinguished from the densely covered upright terminal spikes of the harmless sumacs (conspicuously red in the fruiting stage) and from those of other shrubs with which it is confused. The leaflets, 7 to 13 in number, are borne on

plain round stalks and have a tendency to fold forward in the manner shown in figure 6. In the harmless sumacs the leaves bear 9 to 21 leaflets, or 31 leaflets in the commoner species. Other differences are readily noticed, such as the winglike growth along the margins of the leafstalks of the dwarf sumac and the hairy coverings of the leafstalks and twigs of the staghorn sumac.

### **POISONOUS ACTION OF POISON IVY AND POISON SUMAC.**

Poison ivy and poison sumac are close relatives and are alike in their poisonous properties. Their poisonous principle is a nonvolatile oily substance known as toxicodendrol, which has such violently irritant properties that the slightest trace deposited on the skin is capable of producing severe inflammation. All parts of the plant contain the poison, even after long drying, but growth in which the sap is abundant is the most dangerous.

Poisoning is usually caused by touching or brushing against the plants or by handling clothing or other articles which have been in contact with them. On the other hand, many persons are convinced that they have been poisoned in passing by the plants or observing them from a short distance, without actually touching them, by particles carried through the air. There is much difference of opinion and conflicting evidence on this point. Many sensitive individuals find that they are fully protected by avoiding actual contact with the plants or with articles contaminated with the poison. It is well known, however, that smoke from the burning plants will carry the poison and may cause serious injury.

Many persons believe themselves immune to ivy poison and seem to be able to handle the plants freely without being harmed. Experience and experiments seem to show, however, that complete immunity to ivy poisoning does not exist, and many supposedly immune persons have not only been poisoned by carelessly handling the plants, but afterwards have suffered attacks on the slightest exposure.

Taken internally in sufficient dose the plant is a violent irritant poison. Cases of children who have been poisoned by eating the ripe fruits have been reported.

The symptoms of ivy poisoning are produced as the irritant poison penetrates the outer surface of the skin, and they may appear within a few hours or be delayed until five days or longer after exposure. Itching or burning sensations, with reddening of the poisoned surfaces and more or less swelling, are first noticed, usually followed by the appearance of small vesicles, which may show a tendency to run together and form blisters. Pus may form in these vesicles, followed by a crust or scab formation as the eruption dries. The acute symptoms of the attack usually continue to develop for a day or two,

followed by gradual improvement as the effects of the irritant wear off.

### **PREVENTION OF IVY POISONING.**

Those who are sensitive to ivy poisoning should not only avoid touching the plants, but also should use care in handling articles which may have been in contact with them. Contaminated shoes, clothing, or tools are sources of poisoning sometimes overlooked, as are also animals that have access to poison-ivy patches.

While the plants are sometimes so abundant as to make complete eradication practically impossible, the destruction at least of smaller areas, especially along paths and in frequented situations, should be undertaken.

After exposure to poison ivy, measures to insure the removal of the poison are of primary importance. It should be remembered that at first the poison is on the surface of the skin and can be removed by thorough washing and rinsing repeated several times. Careless washing, however, may serve to spread the poison. Ordinary kitchen or laundry soap which has an excess of alkali is best for the purpose, and hot water should be used. The soap should be used freely, so as to produce an abundant heavy lather on the exposed surfaces, then rinsed off completely, and the operation repeated not less than three or four times. Running water is preferable, or, if a basin is used, the water should be changed frequently. The hands, especially the finger nails, should receive particular attention, in order to remove traces of the poison which they may harbor and transfer to other parts of the body. Hard scrubbing with a stiff brush is not advised, as it may serve to rub in the poison and stir up infection, but there is no objection to wash rags, provided several are used and each discarded in turn. The poison can also be removed by cleansing the exposed parts repeatedly with alcohol diluted with an equal quantity of water. Alcohol merely dissolves the poison and unless applied with caution, insuring its complete removal, will spread it over wider areas. The alcohol may be dabbed on with a piece of absorbent cotton, promptly removing it with a dry piece, discarding each piece of cotton as used and repeating the procedure a number of times.

### **REMEDIES FOR IVY POISONING.**

Mild cases of ivy poisoning generally subside within a few days and do not cause alarm, but fatal cases have occurred. When the inflammation is extensive or severe, a physician should be consulted. Since the inflammation may continue to develop for several days, while the irritant is being slowly absorbed into the tender layers of the skin, it is not surprising that remedies tried in the early stages may prove disappointing or that if they are discarded in favor of

some other remedy just as the poison becomes exhausted the rapid improvement which is then noted may cause the last remedy to be regarded as a sure cure.

Thorough washing, in the manner described as a preventive, should be tried even after the inflammation has developed, in order to remove from exposed surfaces of the skin all traces of the poison that can still be reached.

For the inflammation, simple remedies, such as local applications of solutions of cooking soda or of Epsom salts, one or two heaping teaspoons to a cup of water, are generally as helpful as any. Fluid extract of grindelia, diluted with 4 to 8 parts of water, is often used. Solutions of this kind may be applied with light bandages or clean cloths, which should be kept moist and should also be changed and discarded frequently in order to avoid infection. During the night, or when moist applications can not be used, the poisoned surfaces should be carefully cleaned and dried and left exposed to the air rather than tightly bandaged. Immersing the poisoned parts for several minutes in water as hot as can be borne or applying hot towels where this is impracticable is much recommended for the itching. This measure increases the discomfort at the moment of application, but it is followed by a period of great relief. In the early stages remedies with a fatty or oily base, such as ointments, should not be used, as grease or oil tends to dissolve and spread the poison. In the later stage, after the toxic material has exhausted itself, zinc-oxid ointment and similar mild antiseptic and astringent applications hasten healing.

A simple formula<sup>10</sup> useful both at this and the early stages is the following, which may be dabbed on the poisoned parts after thorough cleansing or applied by saturating one or two thicknesses of a light bandage:

Zinc oxid.....	15 grams.
Phenol .....	2 grams.
Lime water to make 250 cubic centimeters.	

### ERADICATION OF POISON IVY AND POISON SUMAC.

It is usually possible to find persons who do not easily take ivy or sumac poison who can be employed to remove the plants, but with the exercise of proper care almost anyone may undertake the work without incurring injury. Those who are sensitive to the poison and thus have special reason to fear the plants may undertake the work of eradication late in the fall or during the early spring, when the danger of injury is least.

<sup>10</sup> White, James C. *Dermatitis venenata*. Boston, 1887.

Overalls and heavy gauntleted gloves should be worn for protection while engaged in the work. These, with shoes and all articles of clothing which have come in contact with the plants, should afterwards be changed, taking care to avoid injury from the poison which adheres to them and which may make them a possible source of harm for an indefinite period. Thorough washing, in the manner previously recommended, should invariably be practiced after exposure to the plants, and in the washing of clothing or articles contaminated with ivy poison similar precautions should be adopted.

#### DESTRUCTION OF POISON IVY.

In undertaking to destroy poison ivy, the feature to be borne in mind is that the plant arises from creeping underground stems which spread in all directions a few inches below the soil surface and from which new branches or shoots arise at frequent intervals. The various methods of eradication and control follow:

**Chemical methods.**—The parts of the plants above ground are readily killed by spraying with strong brine (3 pounds of salt to a gallon of water), but additional sprayings are necessary to kill the new shoots which soon arise from the rootstocks.

A better method, especially for killing vines on fence posts and on trees, is to cut the poison ivy below the ground and then saturate the soil around the cut bases of the plants with salt brine. A second dose of brine should be applied about two weeks later if the roots show signs of putting forth new growth.

Thorough wetting with kerosene oil, applied with a spraying pump or sprinkler, will kill the plants after one or two applications. The effectiveness of the treatment will be increased if the soil is disked or cut up slightly, so as to expose the roots to the action of the kerosene. As kerosene will injure or destroy all vegetation it is not safe for use around valuable trees and shrubs.

The plants may be killed by spraying them with a solution of sodium arsenite of a strength of 1 pound to 5 gallons of water. This chemical is extremely poisonous, and when it is used caution should be exercised both to prevent injury to the person applying it and to keep horses or other stock from eating the poisoned plants.

Crude sulphuric acid may be used, applying a few drops of the chemical to the bases of the plants at intervals of a week until they die. This may be done conveniently by means of a copper spring-bottom oil can, such as machinists use. Care must be taken to avoid spilling the chemical on the hands or clothing, as it is a dangerous caustic.

**Hand methods.**—The most rapid and effective way to deal with small isolated clumps of poison ivy is simply to pull or grub them out, taking care to remove thoroughly the running underground parts, since pieces of these left in the ground will soon produce another crop of plants.

The plants are killed by frequent mowing, carried out persistently so as to prevent the roots from developing green growth above ground.

**Plowing and cultivation.**—When poison ivy infests grasslands or other situations where plowing is practicable, the best method of eradication is to plow the soil and plant corn or other hoed crops. The frequent cultivation given to such crops will starve the underground parts of poison ivy remaining in the soil.

**Smothering.**—Small patches of poison ivy may be killed by covering them with tarred or other heavy paper, to the complete exclusion of light. The edges of the paper should be either pegged or well weighted down.

**Pasturing.**—Sheep and stock browse on poison ivy without apparent harm to the animals. They may thus be used to hold poison-ivy growth in check, but under ordinary conditions the use of other methods will be necessary to secure complete eradication of the plant.

#### DESTRUCTION OF POISON SUMAC.

Since poison sumac for the most part grows in swampy, inaccessible locations, the expense of eradication is usually not warranted. However, the plant is often found at the edges of paths or roadways bordering upon moist land or on the banks of streams in frequented places, where its presence is the cause of much injury. In situations of this kind it should be completely eradicated. A feature of the plant which adds to the danger is its attractive autumn foliage. Branches are frequently gathered by persons who are not acquainted with the harmful properties of the plant and are painfully poisoned.

In undertaking the work of eradication, the wearing of overalls and heavy gauntleted gloves as well as taking the other protective measures already recommended are of even greater importance than in the case of poison ivy, since the sumac plant contains the poisonous principle in greater abundance and is in consequence more dangerous.

#### METHODS OF ERADICATION.

The available methods of eradication are the following:

**Grubbing.**—Where poison sumac produces a bushy growth, the most practical method of eradication is simply to grub the plants out completely with a mattock, grubbing hoe, or other suitable implement. It is important to remove the roots as completely as practicable, since parts of the root system left in the ground are capable of producing new shoots.

**Cutting and treating with chemicals.**—When it is desired to destroy poison sumac by means of chemicals, and this is the most practical procedure where it grows as a small tree, the plants should first be cut off close to the ground. The newly cut surfaces and the ground surrounding should then be covered with a thin layer of salt, which will tend to prevent sprouting. Kerosene, crude oil, sulphuric acid, or a solution of sodium arsenite, already described in connection with the eradication of poison ivy, may be used, but the cheapest grade of crude salt will be found equally as effective and is the most economical.

#### THE BEST TIME TO ERADICATE POISON SUMAC.

Where, as frequently happens, the poison sumac grows in land that becomes dry during part of the year, the dry season is especially favorable for destroying the plants by cutting, since during this period the roots are least likely to sprout and therefore are more readily killed. To avoid the greater risk of injury incurred in handling the plants while the sap is abundant, and especially during the season when the foliage is dense, making avoidance of contact very difficult, it may be preferable simply to mark the plants, so they can be readily identified after the leaves have fallen. The



work of eradication may then be undertaken during the fall or winter, when it is possible to handle poison sumac with less risk, but it should be remembered that severe poisoning may be caused both by the plants and roots at all stages if handled without the protection of gloves and without taking other precautions to prevent the poisonous material from being deposited on the skin. Winter cutting is not as effective as summer cutting, because during the winter most of the food material of the plants is stored in the roots and consequently they tend to sprout profusely the following spring. It is necessary, therefore, to kill the sprouts in the spring by a liberal application of crude salt, crude oil, or other chemicals, in the manner already described. Simply cutting the sprouts is ineffective unless repeated frequently throughout the growing season.

